MATHEMATICS
CLASS – X

DISTRIBUTION OF MARKS

1.	Number Systems	04 marks
2.	Algebra	20 marks
3.	Co-ordinate Geometry	08 marks
4.	Trigonometry	12 marks
4.	Geometry and Construction	16 marks
5.	Mensuration	10 marks
6.	Statistics and Probability	10 marks
	Total	**80 marks**

WEIGHTAGE OF MARKS FOR INTERNAL ASSESSMENT

The Internal Assessment of 20 marks is to be awarded on the basis of the performance of a student in the activity work, project work and continuous assessment as per the following scheme.
- Assessment through test – 10 marks
- Assessment of Project Work – 5 marks
- Assessment of 2 skills – 5 marks.

For its effective implementation, the following aspects of the scheme should be kept in view:
  a. Internal examination is to be conducted at the school level to assess the activity work and project work done by every student during the year.

  b. Each student must perform at least two activities for assessment of any two skills like numerical ability, observation, ability to see patterns, analytical thinking, understanding logic, skills of comparing, interpreting, problem solving, decision making and skills of games.

  c. The assessment may be carried out by a team of two Mathematics teachers including the teacher teaching the particular class

The break-up of 5 marks for assessment of **activity/skills** could be as:-

- Statement of the objective of activity	-	01 mark
- Design of approach to activity	-	01 mark
- Actual conduct of activity	-	01 mark
- Procedure explanation	-	01 mark
- Result and conclusion	-	01 mark

The marks for assessment of two activities (5 + 5) may be added and the average should be calculated out of 5.

The breakup of 5 marks for assessment of **project** could be as:-

-	Identification and statement of the project	-	01 mark
-	Design of the project	-	01 mark
-	Procedure adopted	-	01 mark
-	Write-up of the project	-	01 mark
-	Interpretation of the result	-	01 mark

UNIT I : NUMBER SYSTEMS

1.   Real Numbers

Euclid's division lemma, Fundamental Theorem of Arithmetic – Statements after reviewing work done earlier and after illustrating and motivating through examples. Proofs of results – irrationality. Decimal representation of rational numbers in terms of terminating/non – terminating recurring decimals.

UNIT II : ALGEBRA

1.   Polynomials

Zeros of a polynomial. Relationship between zeros and coefficients of a polynomial. Statement and simple problems on division algorithm for polynomials with real coefficients.

2.   Pair Of Linear Equations In Two Variables

Pair of linear equations in two variables and graphical method of their solution, consistency/inconsistency. Algebraic conditions for number of solutions. Solution of pair of linear equations in two variables algebraically – by substitution, by elimination and by cross – multiplication method. Simple situational problems must be included. Simple problems on equations reducible to linear equations.

3.   Quadratic Equations

Standard from of a quadratic equation $ax^2 + bx + c = 0$, $(a \neq 0)$. Solution of a quadratic equation (only real roots) by factorization and completing the squares, by using quadratic formula. Relationship between the discriminant and nature of roots.

Situational problems based on quadratic equations related to day to day activities to be incorporated.

4.   Arithmetic Progressions

Motivation for studying Arithmetic Progression. Derivation of standard results of finding the nth term and sum of the first n terms of Arithmetic Progression and their application in solving daily life problems.

UNIT III : TRIGONOMETRY

1.   Introduction to Trigonometry
Trigonometric ratios of an acute angle of a right – angled triangle. Proof of their existence (well defined); motivate the ratios, whichever are defined at 0° and 90°. Values (with proofs) of the trigonometric ratios of 30°, 45° and 60°. Relationships between the ratios.

2.   Trigonometric Identities
Proof and applications of the identity $\sin^2 A + \cos^2 A = 1$. Only simple identities to be given. Trigonometric ratios of complementary angles.

3.   Heights And Distances: Angle of elevation, Angle of depression
Simple and believable problems on heights and distances. Problems should not involve more than two right triangles. Angles of elevation/depression should be only 30°, 45°, 60°.

UNIT IV : COORDINATE GEOMETRY

1.   Lines (In two-dimensions)
Review the concepts of coordinates geometry, graphs of linear equations.   Distance formula. Section formula (internal division), Area of a triangle.

UNIT V : GEOMETRY

1.   Triangles
Definitions, examples, counter examples of similar triangles.
   - i)   (Prove) If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio.
   - ii)   (Motivate) If a line divides two sides of a triangle in the same ratio, the line is parallel to the third side.
   - iii)   (Motivate) If in two triangles, the corresponding angles are equal, their corresponding sides are proportional and the triangles are similar.
   - iv)   (Motivate) If the corresponding sides of two triangles are proportional, their corresponding angles are equal and the two triangles are similar.
   - v)   (Motivate) If one angle of a triangle is equal to one angle of another triangle and the sides including these angles are proportional, the two triangles are similar.
   - vi)   (Motivate) If a perpendicular is drawn from the vertex of the right angle of a right triangle to the hypotenuse; the triangles on each side of the perpendicular are similar to the whole triangle and to each other.
   - vii)   (Prove) The ratio of the areas of two similar triangles is equal to the ratio of the squares on their corresponding sides.
   - viii)   (Prove) In a right triangle, the square on the hypotenuse is equal to the sum of the squares of the other two sides.
   - ix)   (Prove) In a triangle, if the square on one side is equal to the sum of the squares of the other two sides, the angle opposite to the first side is a right angle.

2.   Circles

Tangents to a circle at a point of contact.

    i)   (Prove) The tangent at any point of a circle is a perpendicular to the radius through the point of contact.

    ii)   (Prove) The lengths of tangents drawn from an external point to a circle are equal.

3.   Constructions

    i)   Division of a line segment in a given ratio (internally).

    ii)   Tangent to a circle from a point outside it.

    iii)   Construction of a triangle similar to a given triangle.

UNIT VI : MENSURATION

1.   Areas Related to Circles

Motivate the area of a circle; area of sectors and segments of a circle. Problems based on area and perimeter/circumference of the above said plane figures. (In calculating area of segment of a circle, problem should be restricted to central angles of 60°, 90°, and 120° only. Plane figures involving triangles, simple quadrilaterals and circles should be taken).

2.   Surface Areas And Volumes

    i)   Surface areas and volumes of combinations of any two of the following: cubes, cuboids, spheres, hemispheres and right circular cylinders/cones. Frustum of a cone.

    ii)   Problems involving converting one type of metallic solid into another and other mixed problems. (Problems with combination of not more than two different solids may be taken).

UNIT VII : STATISTICS AND PROBABILITY

1.   Statistics

Mean, median and mode of grouped data (bimodal situation to be avoided) Cumulative frequency graph.

2.   Probability

Classical definition of Probability.   Simple problems on single events (not using set notation).

PRESCRIBED TEXTBOOK:

    -      **Modern abc of Mathematics – X**
             M/S Modern Publishers Chancellor Commercial, H. B. Road,
             Panbazar, Guwahati – 781001.

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